
To adapt recipes in function of the liquor ratio.

Overview.

Concerned	Supervisor.
	Level: Complex.
Content of this document	The quantities of dyestuffs must be modified following rules that are specific to each dyestuff. In this example, the adaptation depends on the liquor ratio but it can be adapted to other variables. This document has been written at ITMProcess 2.1 time. Since ITMProcess 2.2, it is possible to add parameters to each dyestuff record and even formulas (see IP2 TN011 - Quantity related to each dye.doc). With this new feature, you can simplify the following procedure by including the dyestuff factor calculation directly in the dyestuff record.

General.

In the dye class operation line and only in this line, it is possible to modify the dyestuffs quantities individually using the **Table** rule.

Be careful that the rules depending on the amount of dyes, before the dye class operation line, won't reflect the modification of the amount of dyes done in the dye class operation line.

To go around this problem, you can create a parameter that will contain the new amount of dyes and modify the previous rules so that they depend on this parameter.

When doing production correction, the quantities of dyestuffs used are the quantities that are in the recipe, not the quantities after modification. In other words, concerning our example, correction calculation is done based on the liquor ratio of the recipe. The calculated correction at recipe liquor ratio should then be readapted to the liquor ratio of production.

Rules.

1. We add a new operation 'Liquor ratio adaptation' at the beginning of the treatment.

Operations			
#	Name	LabOperation_ID	ProdOperation_ID
1			Ini Reac All in
2	Liquor ratio adaptation		Reac LR adapt
3	Scouring		Sc Co Cv
4	Hot Rinse		Hot Rinse
5	Cold Rinse		Cold Rinse
6	Dyeing		Reac All in
7	Hot Rinse		Hot Rinse

2. In this operation, we calculate a factor for each dyestuff and then we recalculate the total quantity of reactive.

General	Control Line	References
ID: Reac LR adapt AuxID:		
Name: Reac Liquor Ratio adaptation		
☐ LabOperation ☒ Prod operation		
Note: Calculation of the effect of the LR For each dyestuff 'X', a factor 'X Re/P' is calculated. Calculation of the new total quantity of reactive used in production 'SumOf Reac P'. Totalization of each dyestuff quantity multiplied by its factor.		

General	Control Line	References	
1	Pro-B-HEXL Re	Pro-B-HEXL Recipe liquor ratio effect	<Formula>
2	Pro-B-HEXL P	Pro-B-HEXL Production liquor ratio effect	<Formula>
3	Pro-B-HEXL Re/P	Pro-B-HEXL Re/P	<Formula>
4	Pro-R-HEGXL Re	Pro-R-HEGXL Recipe liquor ratio effect	<Formula> ...
5	Pro-R-HEGXL P	Pro-R-HEGXL Production liquor ratio effect	<Formula>
6	Pro-R-HEGXL Re/P	Pro-R-HEGXL Re/P	<Formula>
7	Pro-O-HER Re/P	Pro-O-HER Re/P	1
8	SumOfDyes Reac P	Total quantity of Reactive used in Production	<Formula>

- 2.1. In our example, we have to calculate an 'effect' depending on the liquor ratio.

The parameter 'X Re' is the effect for the dyestuff 'X' at recipe liquor ratio.

The parameter 'X P' is the effect for the dyestuff 'X' at production liquor ratio.

The parameter 'X Re/P' is the ratio of the effects ('X Re'/'X P').

All these parameters have the following setting: Calculate without print.

Formula for
'Pro-R-HEGXL Re':

If re_LiquorRatio		☐ Interpolate between each step		
< or =	Then	Min	Max	Note
5	100			
10	95			
20	90			
30	85			
60	70			
Else		62		

2.2. At the end, we calculate the value of 'SumOf Reac P'.

We list in a table all reactive dyes that may be used with this operation, even if there is no modification of their quantity.

This parameter has the following settings: Calculate without print and Totalize.

Table of Dyestuff					
Value	Do	Min	Max	Note	
Pro-B-HEXL	RecipeAmount("Pro-B-HEXL")*ValueOf("Pro-B-HEXL Re/P")				
Pro-O-HER	RecipeAmount("Pro-O-HER")*ValueOf("Pro-O-HER Re/P")				
Pro-R-HEGX	RecipeAmount("Pro-R-HEGX")*ValueOf("Pro-R-HEGX Re/P")				

Else 0

3. In all operations of the treatment, we replace SumOfDyes('Reac') by ValueOf('SumOfDyes Reac P').

General Control Line References				
1	ST	Starting temperature	25	°C
2				
3	NaCl	Sodium chloride	<Formula>	g/l
4	Soda ash	Soda ash	<Formula>	g/l
5	Caustic Soda 38Bé	Caustic Soda 38Bé	<Formula>	g/l
6	Matexil PA-L	Matexil PA-L	3	g/l
7	Ti	Time	15	min
8				
9	Reac	Reactive	<Formula>	
10	Ti	Time	<Formula>	min
11	Ti	Time	15	min
12	HS	Heating speed	1.2	°C/min
13	DT	Dyeing temperature	80	°C
14	DTi	Dyeing time	<Formula>	min
15		Dye bath		

If ValueOf("SumOfDyes Reac P") ☒ Interpolate between each step

< or =	Then	Min	Max	Note
0	10			
4	90			

Else 90

4. We insert a formula in the dye class operation line that recalculates the quantity of each dyestuff.

Table of Dyestuff					
Value	Do	Min	Max	Note	
Pro-B-HEXL	self*ValueOf("Pro-B-HEXL Re/P")				
Pro-O-HER	self*ValueOf("Pro-O-HER Re/P")				
Pro-R-HEGX	self*ValueOf("Pro-R-HEGX Re/P")				

Else self

Result.

Here is a recipe at liquor ratio 1/20.

Dy...	Dye process	Part	DyeFiberGroup	Colorant set
►	Reactive Exhaust	100%	Co	1/20

#	Product ID	Product Name	Conc	Old
►	1	Pro-B-HEXL	Procion Blue HEXL	0,001
	2	Pro-R-HEGXL	Procion Brilliant Red HEGXL	0,031
	3	Pro-O-HER	Procion Orange HER	0,002

Here is a dyelot using the previous recipe with a liquor ratio of 1/5.

			Volume 1000 l
			Liquor ratio 1/5
Procion Blue HEXL	0,001 %		1,96 g
Procion Brilliant Red HEGXL	0,0279 %		55,8 g
Procion Orange HER	0,002 %		4 g